

### **REMARKS**

This paper is in response to the Office Action mailed August 27, 2004. By this paper, claims 23, 24, 40 and 41 are amended and claims 51-62 are added. Accordingly, claims 1-16, 23-26, 40-43 and 51-62 are pending upon entry of is amendment.

Applicant wishes to thank the Examiner for indicating that claims 14-16 have been determined to be allowable if rewritten in independent form including the limitations of the base claim and any intervening claims. Claim 51 has been added which corresponds to claim 14 rewritten in independent form and claims 52 and 53 have been added which correspond to claims 15 and 16. These claims are now believed to be in condition for allowance.

### **Amendments to the Specification**

The specification has been amended add a description of Figures 17-19 to the Brief Description of the Drawings section of the Specification. As these figures were included with the original application, no new matter has been added by this amendment.

### **Response to Rejection of Claim 1**

Claim 1 is directed to a method of making a mold from shape memory materials for manufacturing castable composite parts. The process uses shape memory polymers to replicate the exterior of a master component part, as shown in Fig. 4, leaving a hollow shape inside the shape memory material. Resin can then be injected into this hollow space within the shape memory polymer. As the resin cures, it takes on the shape and dimensions of the mold. Once the resin is cured, the castable composite part can be removed from the mold by increasing the temperature of the shape memory polymer above the transition temperature of said shape memory polymer, thereby causing the shape memory material to revert to the memorized shape and expel the castable composite part. More particularly, claim 1, as amended, is directed to a method of making a mold comprising, *inter alia*:

providing said shape memory material with a glass transition temperature which exceeds said curing temperature;

processing said shape memory material into a memorized shape; and  
deforming said shape memory material from said memorized shape into a desired mold shape.

Claim 1 in the application stand rejected as being anticipated by Mead (U.S. Patent No. 4,675,061). Applicants submit that Claim 1, is novel and patentable over the references of record, and particularly over Mead, because the cited art does not show or suggest a method of making a mold comprising processing said shape memory material into a memorized shape; and deforming said shape memory material from said memorized shape into a desired mold shape as required by claim 1.

Mead discloses a method for forming corrugated materials using memory metal cores. A base layer of fabric sheets impregnated with bonding material is deposited on a mold form. Several parallel spaced hollow cores, fabricated from memory metal alloy, are positioned on the base layer. An overlying layer is then positioned over the cores and the base layer, the overlying layer also being impregnated with bonding material. The assembly is then subjected to heat and pressure to cure the base layer and the overlying layer. The hollow cores are then removed from between the layers by subjecting them to the critical temperature of the memory metal alloy. Heating the memory metal alloy to the critical temperature causes the core dimensions to contract in all directions causing the cores to shrink. After the cores have shrunk, they can be easily removed from the hardened layers.

In contrast, claim 1 requires that the mold be formed by processing said shape memory material into the memorized shape and then deforming said shape memory material from said memorized shape into a desired mold shape. The mold thus has a different or deformed shape than the memorized shape. Accordingly, when it is desired to remove the composite part from the mold, the mold can be heated to the glass transition temperature. Since the mold shape is different from the memorized shape, the composite part is easily removed or expelled from the mold. Mead fails entirely to teach or suggest deforming the shape memory material from the memorized shape into the desired mold shape.

Accordingly, claim 1 is not anticipated by or made obvious by the cited reference and favorable consideration of claim 1 is respectfully requested. Claims 2-16, depending directly or indirectly from claim 1, are submitted as patentable over the cited references for at least the same reasons.

Response to Rejection of Claim 23

Claim 23 is directed to a method of making a mold from shape memory materials for manufacturing castable composite parts. Claim 23, as amended, comprises, *inter alia*:

- a) providing a film comprising a SMP with a glass transition temperature which exceeds said curing temperature and having an upper and lower surface;
- b) processing said film into a memorized shape;
- c) providing a form having an upper and lower surface, the upper surface of the form having a molded area; and
- d) placing the lower surface of the film onto the upper surface of the form such that the film conforms to the molded area thereof.

Claim 23 in the application stands rejected as being unpatentable over Mead in view of Kawai et al. (U.S. Patent No. 4,950,258). Applicants submit that Claim 23, as amended, is novel and patentable over the references of record, and particularly over Mead and Kawai et al., because the cited art does not show or suggest a method of making a mold comprising processing said film into a memorized shape, providing a form having an upper and lower surface, the upper surface of the form having a molded area, and placing the lower surface of the film onto the upper surface of the form such that the film conforms to the molded area thereof. as required by claim 23.

As set forth above, Mead discloses a method for forming corrugated materials using memory metal cores. Mead does not disclose processing a film into a memorized shape and then placing the film in the form to form. Kawai et al. also fails to teach or suggest inserting a film of shape material polymer on the surface of the form to make the molded area of the mold, and thus

cannot cure the deficiencies of Mead.

Accordingly, claim 23 is not anticipated by or made obvious by the cited reference and favorable consideration of claim 23 is respectfully requested. Claim 40 contains limitations similar to those of claim 23 and is likewise patentable. Claims 24-26 and 41-43, depending directly or indirectly from one of claims 23 or 40, are submitted as patentable over the cited references for at least the same reasons.

Conclusion

In view of the remarks made herein, Applicant submits that the claims presented herein are patentably distinguishable from the art applied and prompt allowance of the application is respectfully requested.

Should the Examiner determine that anything else is desirable to place this application in even better form for allowance, the Examiner is respectfully requested to contact the undersigned by telephone.

Respectfully submitted,

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